

Type I Progress Report: Period October 29, 1973-November 29, 1973

E7.4-10.159

CR-136286

"Made available under NASA sponsorship  
in the interest of early and wide dis-  
semination of Earth Resources Survey  
Program information and without liability  
for any use made thereof."

Geologic Analysis and Evaluation of ERTS-A  
Imagery for the State of New Mexico  
MMC-262

Principal Investigator: Dr. Frank E. Kottowski  
CSFC ID No. S349  
NASA Contract No. NAS5-21861

The images we have received over the last two months (from the summer and fall) are of much better quality than earlier images. We now have good quality, cloud-free images for almost the entire state of New Mexico with the exception of the Sangre de Cristo Mountains in the north central part of the state where cloud cover is still a problem. Some of the best quality images we have received, however, have scan line imperfections over part of the image.

During this reporting period a band 5 mosaic of New Mexico was completed using the best available imagery from 1972 and 1973. Geologic overlays on this base are in progress. The mapping of faults and lineaments in the Rio Grande Valley from ERTS-A imagery is currently being undertaken. This is an area of historic seismic activity as evidenced by Sanford (1965), Sanford and Cash (1969), Topozada and Sanford (1972), and Sanford, et al (1972). Historical earthquake reports from the Rio Grande Valley indicate that a quake of magnitude 6 has the probability of occurring each 100 years. Seismic risk has been shown to be greatest from historical and instrumental data in (1) Socorro-Bernardo, (2) Albuquerque-Belen, (3) El Paso-Las Cruces. As indicated by Sanford

et al (1972), little correlation appears to exist between recent instrument-recorded

Original photography may be purchased from:  
EROS Data Center  
10th and Dakota Avenue  
Sioux Falls, SD 57198

R74-10159) GEOLOGIC ANALYSIS AND  
EVALUATION OF ERTS-A IMAGERY FOR THE  
STATE OF NEW MEXICO Progress Report, 29  
Oct. (New Mexico State Bureau of Mines  
and Mineral) 5 p HC \$3.00 CSCL 08G  
N74-14027  
Unclas 00159  
G3/13

microseismic zones and known structural features. One possible explanation is a recent shift in tectonic stresses; another is that as yet unmapped lineation patterns in alluvium rather than major border fault zones are the key; still other explanations have been given. Linear features observed in the Rio Grande Valley in the area between the northern limit of the Jemez Mountains to an area south of Albuquerque have been compared to the best Gemini and Apollo photography (Apollo AS9-3142 in particular). Structural features on this Apollo photograph are enhanced by snow cover in the Jemez and the Sangre de Cristo Mountains. Comparisons have also been made with available geologic maps.

Band 5 and band 7 ERTS images of this area from different seasons have been examined as well as the color composites in conjunction with the mosaic, but the actual lineament plotting was done on the mosaic.

A Xerox (3600-III) copy of one New Mexico image was made, not specifically for this study, but upon examination we noted that it had a direct application. Linear features are enhanced on the Xerox copy. This may not be true of all Xerox copiers since ours is one of the most finely adjusted in Albuquerque. Figure 1 of the central Rio Grande Valley is used as an example. Albuquerque is located in the upper left along the Rio Grande. The Xerox decreases the number of gray tones (4 definite divisions can be discriminated on the gray scale at the bottom of the image) and increases the light-dark contrast. We have been in touch with the Xerox Corporation for more information on the process.

In plotting fault and lineament patterns in the northern Rio Grande Valley we have found major lineaments (possibly faults) both as discrete units and as

extensions of mapped faults. Many of these are not shown on either the Geologic Map of New Mexico or on the most recent geologic maps of the area. Specifics will be discussed in a later report after the more southerly valley areas have been examined.

Field checking of these lineaments will be difficult in winter months, especially in the northern mountains, but NASA high altitude photography of the Rio Grande Valley (Earth Resources Aircraft Project Flight No. 73-144) should be extremely helpful. We have ordered this data.

No articles or papers have been published during this reporting period. The mosaic, however, has been extremely helpful as an educational tool and has promoted increasing interest and inquiries about ERTS from New Mexico geologists, environmentalists, and the public. We were asked to participate in an education TV program (KUNM-TV) during which we described ERTS operations and showed the mosaic of New Mexico as well as images of other areas in the state.

We have not changed our standing order in this period, nor have we submitted any Image Descriptor Forms.

## REFERENCES

- Sanford, A. R. (1965) An instrumental study of New Mexico earthquakes, N. Mex. Inst. Min. and Tech., State Bur. Mines and Mineral Res., Cir. 78, 12pp.
- Sanford, A. R. (1969) An instrumental study of New Mexico earthquakes, July 1, 1964, through December 31, 1967, N. Mex. Inst. Min. and Tech., State Bur. Mines and Mineral Res., Cir. 102, 7pp.
- Sanford, A. R., et al (1972) Seismicity of the Rio Grande rift in New Mexico, N. Mex. Inst. Min. and Tech., State Bur. Mines and Mineral Res., Cir. 120, 19pp.
- Toppozada, T. R. and Sanford, A. R. (1972) Instrumental study of New Mexico earthquakes January 1968 through June 1971. N. Mex. Inst. Min. and Tech., State Bur. Mines and Mineral Res., Cir. 126, 6pp.

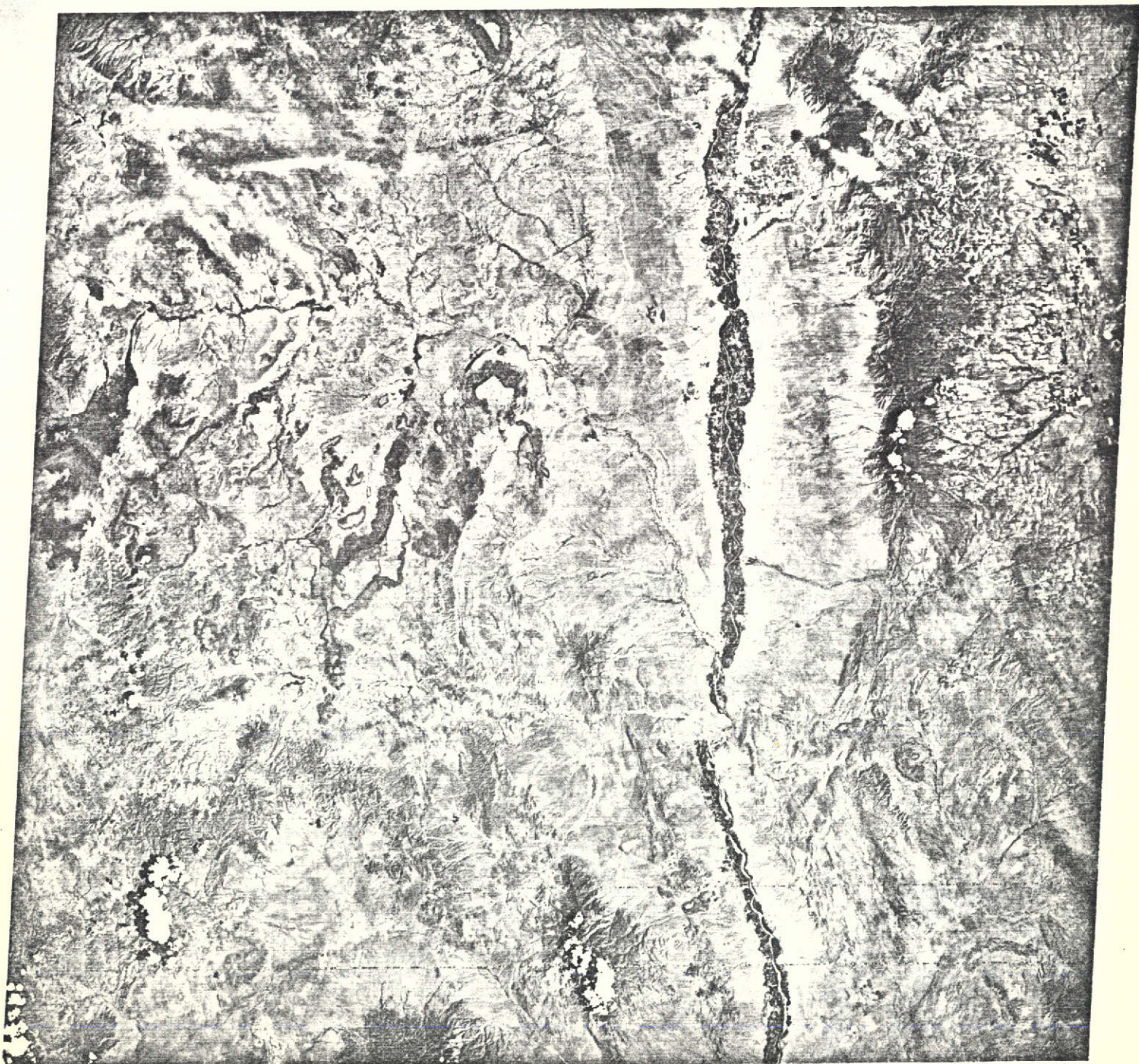


W107-301

IN035-30

W107-00

W106-301



100' 00000

100' 00000

W108-00 W107-301 W107-001 W106-301  
15AUG73 C N34-36/W107-06 N N34-34/W106-59 MSS 5 D SUN EL56 AZ120 190-5410-G-I-N-D-2L NASA ERTS E-1388-17145-5 01